

Calculating 1992 Global Stratospheric Loss Rates For N<sub>2</sub>O, CF<sub>2</sub>Cl<sub>2</sub>, and CFC13  
From CLAES and MLS Data

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The near-global coverage in space and time of the UARS CLAES and MLS data in 1992 allows complete stratospheric distributions for O<sub>3</sub>, N<sub>2</sub>O, CF<sub>2</sub>Cl<sub>2</sub>, and CFC13 to be constructed without significant interpolation or extrapolation. We have used the MLS ozone data from the 205 GHz radiometer to produce twelve monthly zonal mean distributions which are then used to calculate diel average stratospheric photolysis coefficients ("j" values) for the long-lived gases N<sub>2</sub>O, CF<sub>2</sub>Cl<sub>2</sub> (CFC-12), and CFC13 (CFC-11). A diel average density distribution of singlet atomic oxygen (O(1D)) is also derived. From these quantities and the monthly and zonally averaged distributions of the CLAES data for N<sub>2</sub>O, CF<sub>2</sub>Cl<sub>2</sub>, and CFC13, stratospheric loss rates have been calculated. In current understanding, total atmospheric loss for these species occurs only through these processes, so that atmospheric lifetimes can be inferred with knowledge of the global atmospheric burden. And since these gases are well-mixed in the troposphere with carefully monitored abundances, the burden is known. Results will be presented and compared with two-dimensional global model results for which the distributions of long-lived species and ozone are predicted using observed surface boundary conditions and representations of photochemical processes. The sensitivity of the loss rate calculation to the long-lived species distributions will also be demonstrated, to indicate the level of uncertainty in the inferred lifetimes.

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